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EXAMINER	
PATEL, KINARI M	
ART UNIT	**PAPER NUMBER**
2654	10

DATE MAILED: 01/13/2004

Please find below and/or attached an Office communication concerning this application or proceeding.

Office Action Summary	Application No.	Applicant(s)	
	09/655,326	SUNDQVIST ET AL.	
	Examiner	Art Unit	
	Kinari Patel	2654	

-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If the period for reply specified above is less than thirty (30) days, a reply within the statutory minimum of thirty (30) days will be considered timely.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133).
- Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

Status

1)☒ Responsive to communication(s) filed on *02 October 2003*.

2a)☐ This action is **FINAL**. 2b)☒ This action is non-final.

3)☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

Disposition of Claims

4)☒ Claim(s) *1-44* is/are pending in the application.

4a) Of the above claim(s) _____ is/are withdrawn from consideration.

5)☐ Claim(s) _____ is/are allowed.

6)☒ Claim(s) *1-17 and 23-39* is/are rejected.

7)☒ Claim(s) *18-22 and 40-44* is/are objected to.

8)☐ Claim(s) _____ are subject to restriction and/or election requirement.

Application Papers

9)☐ The specification is objected to by the Examiner.

10)☒ The drawing(s) filed on *05 September 2000* is/are: a)☒ accepted or b)☐ objected to by the Examiner.

Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).

Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).

11)☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

Priority under 35 U.S.C. §§ 119 and 120

12)☒ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).

a)☒ All b)☐ Some * c)☐ None of:

1.☒ Certified copies of the priority documents have been received.

2.☐ Certified copies of the priority documents have been received in Application No. _____.

3.☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).

* See the attached detailed Office action for a list of the certified copies not received.

13)☐ Acknowledgment is made of a claim for domestic priority under 35 U.S.C. § 119(e) (to a provisional application) since a specific reference was included in the first sentence of the specification or in an Application Data Sheet. 37 CFR 1.78.

a) ☐ The translation of the foreign language provisional application has been received.

14)☐ Acknowledgment is made of a claim for domestic priority under 35 U.S.C. §§ 120 and/or 121 since a specific reference was included in the first sentence of the specification or in an Application Data Sheet. 37 CFR 1.78.

Attachment(s)

1) ☐ Notice of References Cited (PTO-892)
2) ☐ Notice of Draftsperson's Patent Drawing Review (PTO-948)
3) ☐ Information Disclosure Statement(s) (PTO-1449) Paper No(s) _____.
4) ☐ Interview Summary (PTO-413) Paper No(s). _____.
5) ☐ Notice of Informal Patent Application (PTO-152)
6) ☐ Other:

DETAILED ACTION

Claim Rejections - 35 USC § 103

1. The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

> (a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negatived by the manner in which the invention was made.

2. Claims 1-7, 17, 23-29, and 38 are rejected under 35 U.S.C. 103(a) as being unpatentable over Cohen et al. (Patent No. 5,825,771) in view of Taylor (US Patent 5,982,305) and Kleijn (EP 0680033 A2).

As per claims 1 and 23, Cohen et al. teach a method of improving speech quality in a communication system comprising a first terminal unit (TRX1) and a second terminal (TRX2), (Col. 4, Ln. 2-3, 23-28, and 40-44, Fig. 2, 20a, 20b) the method comprising:

transmitting speech signals having a first sampling frequency (F1) (Col. 4, Ln. 32-34 and 40-44: the audio transceivers transmit a speech signals representing a conversation and all audio signal may be sampled at a certain frequency);

receiving said speech signals (Col. 4, Ln. 34-35);

buffering said speech signals in a playout buffer with said first frequency (F1) (Col. 4, Ln. 36-38, Fig. 1, 15);

Cohen et al. fails to disclose:

playing out said speech signals with a second frequency (F2);

performing a dynamic sample rate conversion of a speech frame comprising N samples on a sample by sample basis, said dynamic sample rate conversion comprising:

creating an LPC-residual comprising N samples derived from said speech frame;

calculating, for each speech frame, whether a sample should be either added or removed from said LPC-residual;

generating a modified LPC-residual comprising at least one of N-1 and N+1 samples, in response to a determination that said calculating so demands; and

synthesizing a speech signal from said modified LPC-residual.

The aforementioned features are well known in the art as taught by Taylor and Kliejn. Taylor teaches performing dynamic sample rate conversion of a speech frame comprising N samples on a sample by sample basis (Col. 7, Ln. 25-35 and Col. 8, Ln. 4-7). Furthermore, Kleijn teaches modifying the speech rate of and excitation signal provided by the speech signal by either inserting or removing sample sequences of the excitation signal which correspond substantially to a pitch period (Page 4, Ln. 1-2). Since the speech rate is changed, the frequency is also changed. Therefore, it would have been obvious to one of ordinary skill in the art at the time the invention was made to modify the method of improving speech quality in a communication system of Cohen et al. to further comprise the step of playing out said speech signals with a second frequency for the purpose of modifying the speech-rate of the signal for faster or slower playback.

Furthermore, Kleijn teaches performing a dynamic sample rate conversion of a speech frame comprising N samples on a sample by sample basis, said dynamic sample rate conversion comprising:

(a) creating an LPC-residual comprising N samples derived from said speech frame. Kleijn teaches separating the short-term correlation from the speech signal to render a residual signal (Page 3, Ln. 39-40). Kleijn further teaches that the manner in which speech segments are excised or inserted by speech-rate modification systems is based on a search for a maximum or minimum in the correlations between speech segments which are separated in time (Page 3, Ln. 43-44). The speech segments separated in time are equivalent to speech frames.

(b) calculating for each speech frame, whether a sample should be either added or removed from said LPC-residual. Kleijn teaches modifying the speech rate of the excitation signal provided by the speech signal source by either inserting or removing sample sequences of the excitation signal which correspond substantially to a pitch period (Page 4, Ln. 2-4). The excitation signal is equivalent to the LPC-residual, and if samples are either inserted or removed, it obviously must be determined first whether a sample should be removed or inserted prior to the insertion or deletion of the samples.

(c) generating a modified LPC-residual comprising at least one of N-1 and N+1 samples, in response to a determination that said calculating so demands. Kleijn teaches modifying the speech rate of the excitation signal provided by the speech signal source by either inserting or removing sample sequences of the excitation signal which correspond substantially to a pitch period (Page 4, Ln. 2-10, Fig. 6, 602). If a sample is removed, the new LPC-residual is

comprised of N-1 samples, and if a sample is inserted, the new LPC-residual is comprised of N+1 samples; and

(d) synthesizing a speech signal from said modified LPC-residual. Kleijn teaches an LPC synthesis filter synthesizing a speech signal having a speech-rate correspond to that of the output signal of the rate adjuster (Page 4, Ln. 10-11. Fig. 6, 603).

Therefore, it would have been obvious to one of ordinary skill in the art at the time the invention was made to modify the method of improving speech quality in a communications system of Cohen to further comprise performing a dynamic sample rate conversion of a speech frame comprising N samples on a sample by sample basis for the purpose of changing the playback rate of the speech signal, said dynamic sample rate conversion comprising:

creating an LPC-residual comprising N samples derived from said speech frame for the purpose of facilitating the rate-change process since the residual has no short-term correlation, as taught by Kleijn (Page 3, Ln. 41-42);

calculating, for each speech frame, whether a sample should either be added or removed from said LPC-residual for the purpose of deciding whether the playback rate should be sped up or slowed down;

generating a modified LPC-residual comprising at least one of N-1 and N+1 samples, in response to determination that said calculating so demands for the purpose of actually changing the rate of the signal; and

synthesizing a speech signal from said modified LPC-residual for the purpose of allowing a listener to hear the speech signal at either a slower or faster rate.

As per claims 2 and 24, Cohen et al. as modified by Taylor and Kleijn disclose all the limitations of the method of improving speech quality in a communications system of claim 1. Cohen fails to disclose the method of claim 1 wherein the creating step comprises performing an LPC-analysis of the speech frame in order to find LPC-parameters of said speech frame.

The aforementioned feature is well known in the art as taught by Kleijn. Kleijn teaches an incoming speech signal subjected to a linear prediction analysis (Page 4, Ln. 36-45). The envelope of the power spectrum and the short-term correlation are the LPC-parameters. Therefore, it would have been obvious to one of ordinary skill in the art at the time the invention was made to modify the method of improving speech quality in a communication system to further include performing an LPC-analysis of the speech frame in order to find LPC-parameters of said speech frame in order to create an LPC-residual.

As per claims 3 and 25, Cohen et al. as modified by Kleijn and Taylor disclose all the limitations of the method of improving speech quality in a communications system of claim 1. Cohen et al. fails to disclose the method of claim 1 wherein the creating step comprises using already existing LPC-parameters from a speech decoder.

The aforementioned feature is well known in the art as taught by Kleijn. Kleijn teaches a decoder that generates an excitation signal based on coded speech parameters stored in memory (Page 6, Ln. 34-36). Therefore, it would have been obvious to one of ordinary skill in the art at the time the invention was made to modify the method of improving speech quality of claim 1 wherein the creating step comprises using already existing LPC-parameters from a speech decoder for the purpose of saving processing time in the creation of a residual signal.

As per claims 4 and 26, Cohen et al. as modified by Taylor and Kliejn disclose all the limitations of the method of improving the quality of speech of claim 1. Cohen et al. fails to disclose the method of improving the quality of speech wherein the creating step comprises using an existing LPC-residual from a decoder. The aforementioned feature is obvious in the art. Using an existing LPC-residual instead of deriving the LPC-residual saves processing time in the method described in the present invention. Therefore, it would have been obvious to one of ordinary skill in the art at the time the invention was made to modify the method of improving the quality of speech of claim 1 wherein the creating step comprises using an existing LPC-residual from a decoder for the purpose of saving processing time.

As per claims 5 and 27, Cohen et al. as modified by Taylor and Kleijn disclose all the limitations of the method of improving the quality of speech of claim 1. Cohen further the following inputs.

sampling frequencies of the sending (TRX1) and receiving (TRX2) terminal units (Col. 2, Ln. 44-47 and Col. 7, Ln. 57-59);

a voice activity detector signal (Col. 5, Ln. 65-67, Col. 6, Ln. 1-2 and 16-22);a status of the playout buffer (Col. 6, Ln. 8-15 and 23-28); and

an indicator of a beginning of a talkspurt (Col. 6, Ln. 3-8).

Cohen et al. fails to disclose the method of claim 1 wherein the calculating step comprises deciding whether a sample should be added or removed based on at least one of the above inputs. However the aforementioned features is obvious in the art.

Deciding whether a sample should be added or removed based on the sampling frequency of the sending and receiving terminals allows the listener to hear the speech signal at the same rate at the receiving end as the transmitting end in the event that the two terminal units are not synchronized with the same sampling frequency. Deciding whether a sample should be added or removed based on a voice activity detector signal allows samples to be added or removed only when there aren't any periods of silence – in the event that there is silence, adding or removing samples would make no difference in what the listener hears because the listener would still hear silence. Deciding whether a sample should be added or removed based on a status of the playout buffer can prevent buffer overflow or underflow of the amount of data in the buffer. Moreover, deciding whether a sample should be added or removed based on the beginning of a talkspurt allows the amount of data in a playout buffer to be controlled, as taught by Cohen et al (Col. 6, Ln. 3-28). Therefore, it would have been obvious to one of ordinary skill in the art at the time the invention was made to modify the method of improving speech quality of Cohen for reasons above.

As per claims 6 and 28, Cohen et al. as modified by Taylor and Kliejn discloses the method of improving the quality of speech of claim 1. Cohen et al. fails to disclose the method of improving the quality of speech of claim 1 wherein the generating step comprises: selecting a position in the LPC residual at which to add or remove a sample; and adding respective removing of said sample. The aforementioned features are well known in the art as taught by Kleijn.

Kleijn discloses excising or inserting speech segments based on a search for a maximum in the correlations between speech segments separated in time (Page 3, Ln. 42-45). Therefore, it would have been obvious to one of ordinary skill in the art at the time the invention was made to modify the method of improving the quality of speech wherein the generating step comprises selecting a position in the LPC residual at which to add or remove a sample, and adding respective removing of said sample for the purpose of adding and removing samples intelligently, rather than haphazardly.

As per claims 7 and 29, Cohen et al. as modified by Taylor and Kleijn discloses all the limitations of the method of improving the quality of speech claim 6. Cohen fails to disclose the method of improving the quality of speech wherein the step of selecting said position is performed arbitrarily. The aforementioned feature is obvious in the art. Selecting said position of adding or removing a sample, arbitrarily, reduces computation and processing time, because calculations, such as correlation between speech segments, does not have to be performed. Therefore, it would have been obvious to one of ordinary skill in the art at the time the invention was made to modify the method of improving the quality of speech of claim 6 for the reason mentioned above.

As per claims 17 and 38, Cohen et al. as modified by Taylor and Kleijn disclose the method of improving the quality of speech of claim 6. Cohen et al. fails to disclose the method of improving the quality of speech wherein said removing comprises removing a sample from the LPC-residual. The aforementioned feature is well known in the art as taught by Kleijn. Kleijn

teaches removing sample sequences of an excitation signal (Page 4, Ln. 2-3). The excitation signal is equivalent to an LPC-residual. Therefore, it would have been obvious to one of ordinary skill in the art at the time the invention was made to modify the method of improving the quality of speech of Cohen et al. wherein said removing comprises removing a sample from the LPC-residual for the purpose of achieving a slower playback rate.

1. Claims 8 and 30 are rejected under 35 U.S.C. 103(a) as being unpatentable over Cohen et al (US Patent No. 5,825,771) as applied to claim 6 above, and further in view of Shlomot et al. (EP 0680033).

As per claims 8 and 30, Cohen et al. as modified by Taylor and Kleijn disclose all the limitations of the method of improving the quality of speech of claim 6. Cohen et al. fails to disclose the step of finding said position via a search for a segment of the LPC-residual with low energy.

The aforementioned feature is well known in the art as taught by Shlomot et al. Shlomot et al. teaches waiting until the excitation signal has low energy before duplicating the silence or unvoiced sub-frame and concatenating it to the sample stream of the excitation signal (Col. 8, Ln. 57-59 and Col. 9, Ln. 1-14). Similarly, Shlomot et al. teaches waiting until the excitation signal has low energy before deleting the silence or unvoiced subframe from the sample stream of the excitation signal (Col. 9, Ln. 8-12). Therefore, it would have been obvious to one of ordinary skill in the art at the time the invention was made to modify the method of improving the quality of speech of claim 6, to further include the step of finding said position via a search

for a segment of the LPC-residual with low energy for the purpose of targeting a specific area of the signal, avoiding areas like the pitch pulse, to add a speech sample so as to maintain a high quality of speech.

2. Claims 9 and 31 are rejected under 35 U.S.C. 103(a) as being unpatentable over Cohen et al (US Patent No. 5,825,771) as applied to claim 8 above, and further in view of Galand et al. (US Patent 5,073,938).

As per claims 9 and 31, Cohen et al. as modified by Taylor, Klein, and Shlomot et al. discloses the method of improving the quality of speech of claim 8. Cohen et al. fails to disclose the method of improving the quality of speech wherein said segment of low energy is found via a block energy analysis.

The aforementioned feature is well known in the art as taught by Galand et al. Galand et al. teaches updating high frequency energy segments on a block basis (Col. 6, Ln. 46-51). Similary, it is obvious to find a segment of low energy on a block-by-block basis, since block analysis is a technique that can be applied to any type of segment of a signal, high energy or low energy. Therefore, it would have been obvious to one of ordinary skill in the art at the time the invention was made to modify the method of improving the quality of speech of claim 8 wherein said segment of low energy is found via block energy analysis for the reason mentioned above.

3. Claims 10 and 32 are rejected under 35 U.S.C. 103(a) as being unpatentable over Cohen et al. (US Patent No. 5,825,771) as applied to claim 8 above, and further in view of Graumann et al. (US Patent No. 5,598,466).

As per claims 10 and 32, Cohen et al. as modified by Taylor, Kliejn and Shlomot et al. disclose the method of improving the quality of speech of claim 8. Cohen et al. fails to disclose a method of improving the quality of speech wherein said segment of low energy is found via a sliding window energy analysis. The aforementioned feature is well known in the art as taught by Graumann. Graumann teaches a "sliding window" of time used in gathering samples of the input signal's energy (Col. 5, Ln. 43-44). Therefore, it would have been obvious to one of ordinary skill in the art at the time the invention was made to modify the method of improving the quality of speech of Cohen et al. wherein each segment of low energy is found via a sliding window energy analysis for the purpose of using a sample period which overlaps at least one previous sample period as a means of increasing accuracy, as taught by Graumann (Col. 5, Ln. 47-48 and 55-56).

4. Claims 11, 12, 33, and 34 are rejected under 35 U.S.C. 103(a) as being unpatentable over Cohen et al. (US Patent No. 5,825,771) as applied to claim 6 above, and further in view of Arjmand et al. (US Patent No. 5,067,158).

As per claims 11 and 33, Cohen et al. as modified by Taylor and Kleijn discloses all the limitations of the method of improving the quality of speech of claim 6. Cohen et al. fails to

disclose the method of improving the quality of speech wherein said position is found using knowledge about a position of a pitch pulse and knowledge about a time difference between said pitch pulse and a following pitch pulse to select the position at which to add or remove a sample in the LPC-residual. The aforementioned feature is well known in the art as taught by Arjmand. Arjmand teaches that the energy in the LPC residual is relatively low except in the vicinity of a pitch pulse where it is significantly higher (Col. 2, Ln. 47-49). By choosing a position relative to the pitch pulse, a better choice can be made as to where to add or remove a sample in the signal so as to maintain a high quality of speech. Therefore, it would have been obvious to one of ordinary skill in the art at the time the invention was made to modify the method of improving the quality of speech of Cohen wherein said position is found using knowledge about a position of a pitch pulse and knowledge about a time difference between said pitch pulse and a following pitch pulse to select the position at which to add or remove a sample in the LPC-residual for the purpose of targeting a specific area to add or remove a sample in order to maintain a high quality of speech.

As per claims 12 and 34, Cohen et al. as modified by Taylor and Kleijn disclose all the limitations of the method of improving the quality of speech claim 11. Cohen et al. fails to disclose the method of improving the quality of speech of claim 6 further comprising the step of finding said pitch pulse via a search for positions in the LPC residual with high energy. The aforementioned feature is well known in the art as taught by Arjmand. Arjmand teaches that the energy in the LPC residual is relatively low except in the vicinity of a pitch pulse where it is significantly higher (Col. 2, Ln. 47-49). Therefore, it would have been obvious to one of ordinary

skill in the art at the time the invention was made to modify the method of improving the quality of speech of Cohen et al. further comprising the step of finding said pitch pulse via a search for positions in the LPC residual with high energy since strong pitch pulses are only located in areas of high energy, as taught by Arjmand.

5. Claims 13 and 35 are rejected under 35 U.S.C. 103(a) as being unpatentable over Cohen et al. (US Patent No. 5,825,771) as applied to claim 12 above, and further in view of Galand et al. (US Patent No. 5,073,938).

As per claims 13 and 35, Cohen et al. as modified by Taylor, Kleijn, and Arjmand discloses all the limitations of the method of improving the quality of speech of claim 12. Cohen et al. fails to disclose the method of improving the quality of speech wherein said positions with high energy are found via a block energy analysis. The aforementioned feature is well known in the art as taught by Galand et al. Galand et al. teaches updating high frequency energy segments on a block basis (Col. 6, Ln. 46-51). If high energy segments are updated, they are obviously found before they are updated. Therefore, it would have been obvious to one of ordinary skill in the art at the time the invention was made to modify the method of improving the quality of speech of claim 8 wherein said positions with high energy are found via block energy analysis for the reason mentioned above.

6. Claims 14 and 36 are rejected under 35 U.S.C. 103(a) as being unpatentable over Cohen et al. (US Patent No. 5,825,771) as applied to claim 12 above, and further in view of Galand et al. (US Patent No. 5,073,938).

As per claims 14 and 36, Cohen et al. as modified by Taylor, Kleijn and Arjmand et al. disclose all the limitations of the method of improving the quality of speech of claim 12. Cohen fails to disclose the method of improving the quality of speech wherein said positions with high energy are found via a sliding window energy analysis. The aforementioned feature is well known in the art as taught by Graumann. Graumann teaches a "sliding window" of time used in gathering samples of the input signal's energy (Col. 5, Ln. 43-44). Therefore, it would have been obvious to one of ordinary skill in the art at the time the invention was made to modify the method of improving the quality of speech of Cohen et al. wherein said positions with high energy are found via a sliding window energy analysis for the purpose of using a sample period which overlaps at least one previous sample period as a means of increasing accuracy, as taught by Graumann (Col. 5, Ln. 47-48 and 55-56).

7. Claims 15, 16, 17, 37, 38, and 39 are rejected under 35 U.S.C. 103(a) as being unpatentable over Cohen et al. (US Patent No. 5,825,771) as applied to claim 6 above, and further in view of Lee et al. (US Patent No. 5,073,938).

As per claims 15 and 37, Cohen et al. as modified by Taylor and Kleijn disclose all the limitations of the method of improving the quality of speech of claim 6. Cohen et al. fails to

disclose the method of claim 6 wherein said adding comprises adding a zero sample. The aforementioned feature is well known in the art as taught by Lee et al. Lee et al. teaches obtaining an excitation signal by appending zero samples after a pitch pulse signal of one period (Col. 3, Ln. 18-19). Therefore, it would have been obvious to one of ordinary skill in the art at the time the invention was made to modify the method of improving of the quality of speech of Cohen et al. wherein said adding comprises adding a zero sample for the purpose of increasing the playback time of the signal.

As per claims 16 and 38, Cohen et al. as modified by Taylor and Kleijn disclose all the limitations of the method of claim 6. Cohen et al. fails to disclose the method of claim 6 wherein adding comprising adding a zero sample and interpolating surrounding samples. The aforementioned feature is well known in the art as taught by Lee et al. Lee et al. teaches obtaining an excitation signal by appending zero samples after a pitch pulse signal of one period (Col. 3, Ln. 18-19). Furthermore, it is obvious to also add interpolating surrounding samples so that a smoother speech signal is formed. Therefore, it would have been obvious to one of ordinary skill in the art at the time the invention was made to modify the method of improving of the quality of speech of Cohen et al. wherein said adding comprises adding a zero sample and interpolating surrounding samples for the purpose of increasing the playback time of the signal.

As per claims 17 and 39, Cohen et al. as modified by Taylor and Kleijn disclose all the limitations of the method of improving the quality of speech of claim 6. Cohen et al. fails to disclose the method of improving the quality of speech wherein said removing comprises

removing a sample from the LPC-residual. The aforementioned feature is well known in the art as taught by Kleijn. Kleijn teaches removing a speech signal sample with use of a memory which stores samples of the excitation signal (Page 4, Ln. 7-8). The excitation signal is the equivalent to the LPC-residual. Therefore, it would have been obvious to one of ordinary skill in the art at the time the invention was made to modify the method of improving the quality of speech of Cohen et al. wherein said removing comprises removing a sample from the LPC-residual.

Allowable Subject Matter

8. Claims 18-22 and 40-44 are objected to as being dependent upon a rejected base claim, but would be allowable if rewritten in independent form including all of the limitations of the base claim and any intervening claims.

9. The following is an examiner's statement of reasons for allowance:

As per claims 18 and 40, Cohen fails to disclose the method of improving the quality of speech of claim 6 wherein said adding comprises:

adding a sample in a history of the LPC residual; and

increasing a lag pointer so long as the adding is within an LPC residual history.

As per claims 19 and 41, the method of claim 6 wherein said removing comprises:

removing a sample in a history of the LPC residual; and

decreasing a lag pointer so long as the removing is within the LPC residual history.

As per claims 20 and 42, the method of claim 6 wherein the second terminal unit comprises an adaptive and a fixed codebook; and

wherein said adding comprises:

adding a sample in a output from the adaptive codebook;

extending an output from the fixed codebook; and

increasing a lag pointer so long as the adding is within the LPC residual history.

As per claims 21 and 43, the method of claim 6 wherein the second terminal unit comprises an adaptive and a fixed codebook; and

wherein said removing comprises removing a sample in an output from the adaptive codebook;

shortening an output from the fixed codebook; and

decreasing a lag pointer so long as the removing is within the LPC residual history.

As per claims 22 and 44, the method of claim 6 wherein the second terminal unit comprises a fixed codebook; and

wherein said adding or removing comprises adding or removing a sample in an output from the fixed codebook.

Any comments considered necessary by applicant must be submitted no later than the payment of the issue fee and, to avoid processing delays, should preferably accompany the issue

fee. Such submissions should be clearly labeled "Comments on Statement of Reasons for Allowance."

Response to Arguments

10. Applicant's arguments with respect to claims 1 and 23 have been considered but are moot in view of the new ground(s) of rejection.

Regarding claims 1 and 23, Applicant states, "The combination of Kleijn with Cohen does not teach the elements of performing a dynamic sample rate conversion of a speech frame comprising N samples on a sample by sample basis as required by claims 1 and 3." This limitation is taught by new reference Taylor (US Patent 5,982,305). Taylor discloses increasing the sample rate by inserting zero-valued samples between the signal's existing data samples (Col. 7, Ln. 30-35). Thus, sample rate conversion is performed on a sample by sample basis. It would have been obvious to one of ordinary skill in the art at the time of the invention to modify the method of improving speech quality in a communications system of Cohen et al. with the method of Taylor wherein dynamic sample rate conversion of a speech frame comprising N samples is performed on a sample by sample basis because one with ordinary skill in the art would readily recognize that this would allow fine adjustments as necessary.

11. In response to applicant's argument that the examiner's conclusion of obviousness is based upon improper hindsight reasoning, it must be recognized that any judgment on

obviousness is in a sense necessarily a reconstruction based upon hindsight reasoning. But so long as it takes into account only knowledge which was within the level of ordinary skill at the time the claimed invention was made, and does not include knowledge gleaned only from the applicant's disclosure, such a reconstruction is proper. See *In re McLaughlin*, 443 F.2d 1392, 170 USPQ 209 (CCPA 1971).

Conclusion

Any inquiry concerning this communication or earlier communications from the examiner should be directed to Kinari Patel whose telephone number is 703-305-8487. The examiner can normally be reached on 9 AM - 5 PM.

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Richemond Dorvil can be reached on 703-305-9645. The fax phone number for the organization where this application or proceeding is assigned is 703-872-9314.

Any inquiry of a general nature or relating to the status of this application or proceeding should be directed to the receptionist whose telephone number is 703-305-3900.

kp

RICHEMOND DORVIL
SUPERVISORY PATENT EXAMINER